Internet of Things (IoT): A review

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Abstract:

Internet of things is a current buzzword, to make every device interconnected in order to do the task more conveniently than the conventional method. This paper discusses the implementation of Internet of Things in our day to day life.

Keywords: *IoT, automation, Smart Home*

Introduction

The major role played by internet of things is to establish the connection among the various things. As we are living in the internet era and the technology has advanced a lot and now the concept of smart devices or connected devices has come into play. These devices store and use every little bit of data we share with them and interact with us daily on those bases and complete the task. IoT describes a vision in which the everyday objects will become a part of the network and intelligence will be added to them along with the other things in network, which affects on the personal environment, social environment as well as professional environment.

Literature Review

There can be many applications of the IoT like smart homes, smart vehicles, smart cities, industrial application, wearables, agriculture and many more

Smart Homes: Sameek Ghosh [4] proposed a paper on smart home, the application of IoT. The home appliances like lights, fans, air conditioners, security systems, gas sensors, motion detectors etc. all are connected over a network and are further controlled by the controller which provide them intelligence in order to make a reliable home automation system, like the lights will be turned on as soon as you reach home, the coffee will be made automatically and air conditioner will be turned on. Modern smart homes use machine learning, which uses every bit of data we share with them and interact with us on daily basis. Smart home also includes security implementation which protects the house form any kind of theft, another features includes automated parking of the car in the garage as soon as a recognized vehicle reaches the garage door, the car is detected by RFID (Radio Frequency Identification). A smart home can not be called smart if it doesn't contribute to the society at large. It should support the smart city feature to be "smart" in real sense. A smart home should use clean energy to get power, should have adequate water supply which should be done using the rain water harvesting, it should be planned properly and affordable, the network connection should be good enough to handle the multiple devices as well as the should have some protocol when it gets to know about any trojan.

Security: Sachchidanand Singh [6] Nirmala Singh [6] proposed in their paper that the security is the major concern of Internet of Things (IoT) devices. The IoT application data can be personal, industrial, enterprise or consumer but the data should be secured against theft and tampering and should be protected. For example an IoT device may have stored historical and current data of person's health, shopping, location, finances and business orders etc.

Security is at utmost concern when data is sent across the Internet or even secured private networks and VPNs. As everything is connected to the internet by means of wired or wireless connection, the advance technologies are capable enough to break into that, which means there should be some measures or we can say there should be fail safe which will protect our security. The security system should not be vulnerable to any kind of virus or trojan.

The IoT security tasks should ensure that proper application level protections like Distributed Denial of Service (DDoS) attack mitigation are in place. It should also opt measures to confirm the identity by requesting access to any data including multi-factor authentication

Smart Vehicles: With the growth of all the technology, achieving small things step by step, now is the time for the smart vehicles. These vehicles are interconnected and can communicate with each other in order to work things out on the road. On road there are many vehicles and if a vehicle is made smart then it should communicate with other vehicles on the road, otherwise there will be chaos of accidents and this is achieved by implementing the Artificial Intelligence (AI) into the vehicles so as it is able to make the complex decisions all by itself and there will be no need of the driver, which is the main motive of smart vehicles. In future these smart vehicles can remove the driver completely and can run all by itself.

As we all know the conventional way of powering a vehicle is using fuel which burns in the combustion engine to produce the power, as much as we are using our vehicles now a days the non-renewable source of energy is going to get vanished soon and to overcome this there is a need to implement the hybrid vehicles or just electric vehicles which will have lower carbon footprint and also help us in preserving the resources for future use.

Wearables: Fan Wu∗, Christoph Rudiger ¨ †, Jean-Michel Redoute´ ∗ and Mehmet Rasit Yuce∗[5] had proposed a paper which presents a wearable IoT sensor node aiming to monitor harmful surrounding conditions using LoRa technology it is a low-powered sensor node. It focused in monitoring the harmful gases like carbon monoxide, ultra violet rays, carbon dioxide and other environmental fumes that may harm the body. Poor environment could cause various health problems. Thus, surrounding environmental data is captured by using the wearable node then sent to a remote cloud server. The stored data can be displayed to authorized users using a web-based cloud server and the device will provide alert to the user via mobile application when that condition occurs. The wearables can used to monitor a person's health.

It's a challenging work to design and implement a wearable node for safety application. For example, sensors' selection, power management, and networking type should be carefully considered. In this work, the wearable sensor nodes should be based on the technology which provides only safety and do not make any harmful effect on the user.

Agriculture: Aarti Rao Jaladi 1, Karishma Khithani2, Pankaja Pawar3, Kiran Malvi4, Gauri Sahoo5 in their paper shows that with the development of wireless sensor networks the monitoring and controlling of various parameters in agriculture field, weather stations is more convenient. The sensor is basically a power efficient embedded system with different sensors like analog I/O ports to connect sensors and onboard sensors. Like software, hardware should be developed, including OS, hardware/sensor drivers,

networking protocols and application-specific sensing and processing algorithms. The purpose of agricultural monitoring is different in different situations, but important aim is to grow a healthy crop. These wireless sensors can also be used for environmental monitoring, in order to check the harmful gases in the environment, which are released on daily basis.

With Environmental monitoring, the aim is to find risks to human and wildlife, scope to population migration from high density areas to low density areas and to restrict emission of gases. Wireless sensor network (WSN) is a cheap, power efficient wireless network made up of many of smart sensor nodes which monitor many physical or environmental conditions, such as pressure, temperature, moisture etc. at different area or different location. The Internet of Things (IoT) is an emerging key technology for future. The Internet of Things (IoTs) can be described as connecting everyday objects to the Internet where the devices are intelligently connected together enabling new form of communication between people and things, and between things themselves. Building IoTs has advanced significantly in the last couple of years since it has added a new dimension to the world of information and communication technologies.

Conclusion: In this paper preliminary model have been presented illustrating the implementation of Internet Of Things. According to research firm International Data Corporation (IDC) the fast growth of cloud and Internet connected devices is expected to boost IoT market. With the implementation of Internet of Things, we will be occupied by a lot more devices to rely upon and can do the task in efficient ways

With the smart home there will be sire in standard of living of people and that also helps in making the smart cities as smart homes are the building blocks of the smart cities and ultimately a smarter Nation.

With the wearable IoT devices it is possible to gather information about the surroundings as well as information about one’s own health. Although, considering everything there is the need to look at the security aspect of IoT, which is also impressive as there are many ways to keep the personal data safe.

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